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Uncertainty Measures for Economics Journal Impact Factors

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Academic economists appear to be intensely interested in rankings of journals, institutions, and individuals. Yet there is little discussion of the uncertainty associated with these rankings. To illustrate the uncertainty associated with citations-based rankings, I compute the standard error of the impact factor for all economics journals with a five-year impact factor in the 2011 Journal Citations Report*. I use these to derive confidence intervals for the impact factors as well as ranges of possible rank for a subset of thirty journals. I find that the impact factors of the top two journals are well defined and set these journals apart in a clearly defined group. An elite group of 9–11 mainstream journals can also be fairly reliably distinguished. The four bottom ranked journals are also fairly clearly set apart. For the remainder of the distribution, confidence intervals overlap and rankings are quite uncertain.* (*JEL* A14)

1. *Introduction*

Academic economists appear to be intensely interested in rankings of journals, institutions, and individuals. This is evidenced by the popularity of the rankings provided by RePEc (Zimmermann 2009) and academic articles providing rankings for each of these categories (e.g., Coupé 2003; Kalaitzidakis, Mamuneas, and Stengos 2003; Dusanky and Vernon 1998; Laband and Piette 1994; Liebowitz and Palmer 1984; Halkos and Tzeremes 2011). Yet, with a few exceptions (Oswald 2007; Wall 2009; Halkos and Tzeremes 2011), there is little discussion of the uncertainty associated with these rankings.

The situation is similar in the rest of science. Though Vanclay (2012), Leydesdorff and Opthof (2010), and Moed et al. (2012) call for confidence intervals to be provided for journal impact factors (IFs), few studies have been conducted on the precision of

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bibliometric indicators.[1] Notable exceptions are Schubert and Glänzel (1983) who proposed computing standard errors for IFs and implemented their procedure for all *Journal Citation Reports* (*JCR*) journals whose titles began with A, Opthof (1997) who computed standard errors for the IFs of two journals with IFs of 6.24 and 2.69, concluding that, not surprisingly, the difference between these two journals was highly significant, and Greenwood (2007) who estimates credibility intervals for the IFs of all journals in research and experimental medicine in the *JCR*.

The most popular journal rankings among economists are probably the RePEc rankings (Zimmermann 2009) and those of Kalaitzidakis, Mamuneas, and Stengos (2003).[2] As RePEc describes their ranking as experimental, I focus on the peer-reviewed article by Kalaitzidakis, Mamuneas, and Stengos (2003). Kalaitzidakis, Mamuneas, and Stengos (2003) use several indicators of impact, all but one of which uses citations in 1998 to articles published from 1994 to that year. Their preferred indicator is a recursive indicator that excludes journal self-citations and normalizes by the number of pages published in each journal. The first step in the recursion is computed as the citations in 1998 per page published in the previous four years. As a robustness check, they instead normalize by the number of articles where the first step is then the conventional impact factor, though excluding journal self-citations.[3] Therefore, the uncertainty associated with simple impact factors should carry over into the uncertainty regarding recursive impact factors.

Despite this preference in the economics journal literature, simple IFs are widely used. The vast majority of journals in Kalaitzidakis, Mamuneas, and Stengos's (2003) group of thirty top journals display their two- or five-year IF or their rank in the *JCR* prominently on their homepage. None present recursive impact factors. Some institutions and countries even provide financial bonuses that depend on the IFs of the journals researchers publish in (Shao and Shen 2011; Jiménez-Contreras et al. 2002).

To illustrate the uncertainty associated with IFs, I compute the standard errors of the five year IFs for all 230 economics journals that have five-year IFs in the 2011 *JCR* using article level data from the *Web of Science.* The five year IF is similar to the first step in Kalaitzidakis, Mamuneas, and Stengos's (2003) iterative impact factors. Due to the slow process of article production and review common in economics (Ellison 2002), this is likely to be a better indicator of the quality of economics journals than the two-year IF. I construct confidence intervals for each journal IF and compute *t*-tests for the differences between the IFs of Kalaitzidakis, Mamuneas, and Stengos's (2003) top thirty journals and all other journals. Following the suggestion of Wall (2009), I also report the median citations for all journals and compare these to the IFs.

[1] The simple IF is defined as the mean number of citations received in a given year by articles published in a journal in a number of preceding years. The *Journal Citation Reports* published by Thomson Reuters reports IFs for articles published in the preceding two and five years. Recursive or iterative impact factors (Pinski and Narin 1976; Liebowitz and Palmer 1984; Labande and Piette 1994; Kalaitzidakis, Mamuneas, and Stengos 2003; Palacios-Huerta and Volij 2004; Bergstrom 2007; Zimmermann 2012) use an iterative process to compute the factors while taking into account the prestige of the citing journals. Recursive IFs better reflect journal prestige while simple IFs reflect popularity (Bollen et al. 2009). Other publicly available indicators of journal quality are the source-normalized impact (Moed 2010) provided by Elsevier that takes into account the differing citation potential in different fields and the journal h-index provided by *Google Scholar Metrics*.

[2] This article has been cited more than 400 times on Google Scholar.

[3] Palacios-Huerta and Volij (2004) argue that it is better to use this variant. Their preferred "invariant" IF based on the work of Pinski and Narin (1976) also weights citations by the number of references in average articles in the citing journal when computing the initial IF. This is a source normalized and recursive IF.

I leave to future research the task of developing confidence intervals for recursive IFs.

Some (e.g., Pudovkin and Garfield 2012) argue that, as journal IFs use all available data to compute the mean number of citations in a given year to articles published in a journal during a previous number of years, there is no uncertainty associated with them. However, in common with many researchers (e.g., Redner 1998; Glänzel 2009; Stringer, Sales-Pardo, and Nunes Amaral 2008), I assume that the citations received in a subsequent year by articles published in a journal in a given period are stochastic. The impact factor is then an estimate of the first moment of the unknown probability distribution function. As such, there is uncertainty in estimating this underlying parameter.

The use of journal IFs as indicators of individual article quality is frequently criticized (Vanclay 2012). As the distribution of citations to the articles in any journal is usually very dispersed and skewed (Seglen 1992; Redner 1998; Peterson, Pressé, and Dill 2010), the correlation between journal IFs and the citations received by individual articles is necessarily low. Lozano, Larivière, and Gingras (2012) show that, for the journals included in the *Web of Science* database, the correlation between the number of citations received by articles in the two-year IF window and the respective journals' IFs has been in the range of 0.45–0.60 in recent decades but is much lower in the subset of social science journals. They show that the correlation increased over the twentieth century and less convincingly that it has decreased in the last two decades. Hegarty and Walton (2012) show that article and reference list length are better predictors of citations to an individual article than the journal IF. There is, however, a strong positive correlation between the average number of citations received by articles published by research groups in chemistry in the Netherlands and the average impact factor of the journals they publish in (van Raan 2012). Furthermore, de Marchi and Rocchi (2001) and Aarsen et al. (2008) show that there is a strong negative correlation between IFs and journals' acceptance rates, which measure journal selectivity and, therefore, are a proxy for quality. In any case, as IFs and related measures such as recursive IFs are used routinely as measures of journal quality, it is important to at least be aware of the precision with which they are estimated.

2. *Previous Research on Citation Distribution in Economics*

Previous research on the distribution of citations to articles in economics finds that the distribution of citations to articles in a journal is skewed and that there is much overlap between the number of citations received by articles in lower and higher ranked journals.

Laband (1986) examined the citations received from 1977 to 1982 by the 5,880 articles published in forty economics journals between 1974 and 1976. Eighty-four percent of the articles received from 0 to 9 citations, while only 0.3 percent of articles were cited more than 100 times. Further analysis showed that the high IFs of top journals depended mostly on attracting a few highly cited papers. In a broader sample of journals (seventy-three in 1974 and ninety-one in 1996), Laband and Tollison (2003) found that more than 20 percent of papers had zero citations in the five years following publication. Eighty-five percent (1996) to 89 percent (1974) of articles received less than ten citations in the following years.

Oswald (2007) examined the distribution of citations to articles in six economics journals of varying reputation. He selected articles from the 1981 winter issue of the journals and computed the total citations received since then. Oswald finds that the best article in an issue of a good to

medium-quality journal routinely goes on to have much more citation impact than a "poor" article published in an issue of a more prestigious journal.

Wall (2009) examined the distribution of citations to articles in thirty economics journals. He compiled citations in the *Web of Science* from 2001 to 2008 to all articles published in 2001 in these journals, which consist of the top journals in economics excluding those that mostly invite papers, such as the *Journal of Economic Literature* (*JEL*). He found that the most cited article in each journal usually received at least 10 percent of the total citations that the journal received and, in one case, 38 percent of the total citations received. Most journals also had some articles that received no citations at all with the share ranging from 2 to 12 percent of articles published in 2001 remaining uncited. The degree of skewness varied across journals. The *Quarterly Journal of Economics* (*QJE*) had the lowest skewness and the *American Economic Review* (*AER*) the highest. Median citations to the *QJE* were more than double the next ranked journal, the *AER*. On this basis, the *QJE* is clearly differentiated from all other journals. The weakest of the top thirty journals all had articles cited more than the median article in the top four journals, though actually two journals did not have any articles cited as often as the median *QJE* article. Journals differed more in terms of the shares of their articles with different levels of citations—the topmost journals have a large number of highly cited articles while the bottom ranked journals have relatively few. Wall (2009) argues that we should use the median of article citations rather than the mean to assess journal quality.

The number of citations that papers receive reflects quality, chance, and marketing efforts (Hudson 2007). Hudson shows that (for the *AER* and *Economic Journal*) articles published in issues of journals that include highly cited articles have increased citations. This must simply be the effect of serendipity in article discovery. Citations are also positively related to length of articles, location within in the journal issue, and the number of self-citations the paper receives. It seems that editors place what they think are the high quality papers first in each issue while self-citations increase the visibility of papers.

3. *Data and Results*

I collected from the *Web of Science* all citations in 2011 to each article published in the years 2006 to 2010 in all 230 journals in the *JCR* economics subject category that had a five-year IF. For all journals, except *JEL* and the *Economic History Review* (*EHR*), I carried out a search restricted to the document type "articles" for items published in 2006–10 with results limited to 2006 to 2011. I then requested a "citation report" from the database and downloaded the resulting file. For the *JEL* and the *EHR*, I instead requested all articles and then removed short book reviews manually. The 230 journals published a total of 54,416 articles in the five-year period, which received a total of 88,676 citations in the *Web of Science* in 2011. As the IF is the mean number of citations received by articles published in a given period, I estimate its standard error using the usual formula for the standard error of the mean, $\sigma_{IF} = \sigma/N^{0.5}$, where σ is the standard deviation of citations in 2011 to articles published in 2006 to 2010 in the journal in question and N is the number of such articles. I construct 95 percent confidence intervals by adding and subtracting $1.96\sigma_{IF}$ to the estimated IF.

The results are shown in table 1.[4] The computed IFs are in most cases lower than

[4]The table also reports results for the *AER* and the *Journal of the European Economic Association* (*JEEA*) excluding their annual Papers and Proceedings issues. The *AER* would be ranked 5th instead of 11th and the *JEEA* 30th instead of 52nd if these issues are excluded. I include these issues in my main results as the official *JCR* IFs include them.

TABLE 1
JOURNALS RANKED BY ESTIMATED IMPACT FACTOR

	Abbreviated journal title	2011 JCR 5-year IF	Estimated 5-year IF	Standard deviation	Standard error of the mean	# of articles 2006–2010	97.5%	2.5%	Median citations
1	J ECON LIT	9.426	9.281	13.593	1.380	97	11.986	6.576	3
2	Q J ECON	8.184	8.261	8.248	0.573	207	9.384	7.137	6
3	J FINANC	6.333	6.173	6.522	0.327	399	6.813	5.533	4
4	J ECON PERSPECT	5.865	6.027	8.857	0.596	221	7.195	4.859	3
	AM ECON REV not incl. P&P		*6.059*	*6.661*	*0.215*	*454*	*6.480*	*5.638*	*4*
5	J FINANC ECON	5.676	5.730	7.504	0.344	477	6.403	5.056	4
6	J POLIT ECON	5.416	5.050	5.539	0.439	159	5.911	4.189	3
7	REV FINANC STUD	5.178	4.827	10.024	0.475	445	5.758	3.896	3
8	ECONOMETRICA	4.7	4.567	6.344	0.381	277	5.314	3.820	3
9	J ECON GEOGR	5.025	4.293	5.138	0.424	147	5.123	3.462	3
10	J ACCOUNT ECON	4.306	4.171	4.979	0.382	170	4.919	3.422	2.5
11	AM ECON REV	4.076	4.135	5.641	0.182	964	4.491	3.779	2
12	J ECON GROWTH	3.917	4.117	5.188	0.670	60	5.429	2.804	2
13	REV ECON STUD	4.08	4.097	4.885	0.317	237	4.719	3.475	3
14	AM ECON J-MACROECON	3.836	4.073	4.333	0.584	55	5.218	2.928	3
15	REV ECON STAT	3.812	3.764	5.434	0.307	313	4.366	3.162	2
16	REV ENV ECON POLICY	3.508	3.698	3.723	0.469	63	4.618	2.779	2
17	ECON GEOGR	4.149	3.443	4.425	0.498	79	4.419	2.467	1
18	J LABOR ECON	3.368	3.316	5.385	0.498	117	4.292	2.341	2
19	J ENVIRON ECON MANAG	3.06	3.170	3.467	0.235	218	3.630	2.709	2
20	J HUM RESOUR	3.162	3.054	3.935	0.305	167	3.651	2.457	2
21	ECOL ECON	3.267	3.015	4.561	0.126	1,314	3.262	2.769	2
22	J HEALTH ECON	3.165	2.982	3.677	0.187	387	3.348	2.616	2
23	EXP ECON	3.313	2.971	13.624	1.164	137	5.252	0.689	1
24	AM ECON J-APPL ECON	2.811	2.892	2.836	0.330	74	3.538	2.246	2
25	ENERG ECON	2.913	2.851	3.260	0.136	576	3.117	2.584	2
26	J INT ECON	2.77	2.841	4.563	0.246	345	3.322	2.359	1
27	J URBAN ECON	2.629	2.611	3.013	0.176	293	2.956	2.266	2
28	WORLD BANK ECON REV	2.476	2.590	3.715	0.363	105	3.301	1.880	2
29	ECON SOC	2.378	2.589	3.731	0.361	107	3.296	1.882	1
	J EUR ECON ASS not incl. P&P		*2.493*	*4.567*	*0.258*	*146*	*2.999*	*1.987*	*1*
30	ECON J	2.719	2.457	3.497	0.168	435	2.786	2.129	1
31	J DEV ECON	2.693	2.452	3.494	0.167	436	2.780	2.124	1
32	J MONETARY ECON	2.576	2.415	3.367	0.156	468	2.720	2.109	1

TABLE 1
Journals Ranked by Estimated Impact Factor (*continued*)

	Abbreviated journal title	2011 JCR 5-year IF	Estimated 5-year IF	Standard deviation	Standard error of the mean	# of articles 2006–2010	97.5%	2.5%	Median citations
33	ECON HUM BIOL	2.457	2.348	3.141	0.248	161	2.833	1.863	1
34	SMALL BUS ECON	2.287	2.341	3.180	0.197	261	2.727	1.955	1
35	J ECONOMETRICS	2.496	2.333	3.741	0.142	697	2.611	2.055	1
36	IMF ECON REV	2.2	2.300	1.567	0.496	10	3.271	1.329	2
37	FOOD POLICY	2.432	2.290	2.935	0.184	255	2.650	1.930	2
38	PHARMACOECONOMICS	3.013	2.285	2.693	0.158	291	2.595	1.976	2
39	VALUE HEALTH	2.811	2.277	4.082	0.169	585	2.608	1.946	1
40	HEALTH ECON	2.49	2.268	2.806	0.128	481	2.519	2.017	1
41	RAND J ECON	2.333	2.251	3.499	0.230	231	2.702	1.800	1
42	J ECON SURV	2.033	2.204	5.023	0.473	113	3.130	1.277	1
43	J BUS ECON STAT	2.442	2.196	3.778	0.282	179	2.749	1.642	1
44	J BANK FINANC	2.249	2.188	2.405	0.075	1,026	2.335	2.041	2
45	WORLD DEV	2.18	2.165	2.908	0.113	665	2.386	1.944	1
46	IND CORP CHANGE	2.109	2.158	3.670	0.250	215	2.649	1.668	1
47	J PUBLIC ECON	2.196	2.137	2.738	0.118	540	2.368	1.906	1
48	J RISK UNCERTAINTY	2.22	2.119	2.729	0.243	126	2.596	1.642	1
49	ECON POLICY	3.012	2.113	2.624	0.293	80	2.688	1.537	1
50	J FINANC QUANT ANAL	2.146	2.111	2.519	0.168	226	2.439	1.782	1
51	AM ECON J-ECON POLIC	1.98	2.082	2.507	0.358	49	2.784	1.380	1
52	J EUR ECON ASSOC	1.965	2.000	3.564	0.201	314	2.394	1.606	1
53	JCMS-J COMMON MARK S	1.811	1.916	2.642	0.163	263	2.236	1.597	1
54	INT J FORECASTING	2.45	1.910	3.041	0.199	233	2.300	1.519	1
55	J LAW ECON	1.89	1.903	2.540	0.212	144	2.318	1.488	1
56	J APPL ECONOMET	2.147	1.872	3.635	0.230	250	2.323	1.421	1
57	ENERG J	2.599	1.852	3.177	0.204	243	2.251	1.452	1
58	EUR REV AGRIC ECON	1.788	1.841	2.763	0.260	113	2.350	1.331	1
59	ANNU REV ECON	2.63	1.824	1.930	0.331	34	2.472	1.175	1.5
60	REG STUD	1.784	1.807	3.886	0.198	384	2.196	1.419	1
61	J REGIONAL SCI	1.864	1.807	2.266	0.168	181	2.137	1.477	1
62	OXFORD REV ECON POL	1.896	1.792	2.496	0.197	160	2.179	1.406	1
63	CAMB J ECON	1.427	1.791	2.712	0.196	191	2.175	1.406	1
64	BROOKINGS PAP ECO AC	3.421	1.789	2.717	0.360	57	2.495	1.084	1
65	EUR ECON REV	1.86	1.786	2.624	0.137	365	2.055	1.517	1
66	WORLD BANK RES OBSER	1.843	1.778	2.152	0.321	45	2.407	1.149	1
67	LAND ECON	1.798	1.777	2.355	0.166	202	2.102	1.452	1

TABLE 1
JOURNALS RANKED BY ESTIMATED IMPACT FACTOR (*continued*)

	Abbreviated journal title	2011 JCR 5-year IF	Estimated 5-year IF	Standard deviation	Standard error of the mean	# of articles 2006–2010	97.5%	2.5%	Median citations
68	J AGR ECON	1.796	1.776	2.011	0.161	156	2.091	1.460	1
69	WORK EMPLOY SOC	1.597	1.745	1.988	0.147	184	2.032	1.457	1
70	CAMB J REG ECON SOC	1.822	1.740	2.148	0.251	73	2.232	1.247	1
71	INT ECON REV	1.78	1.738	3.005	0.194	240	2.118	1.357	1
72	J MONEY CREDIT BANK	1.724	1.708	2.695	0.129	439	1.961	1.456	1
73	J COMP ECON	1.652	1.697	2.073	0.152	185	1.996	1.399	1
74	ENVIRON RESOUR ECON	1.714	1.695	2.643	0.129	417	1.949	1.442	1
75	APPL ECON PERSPECT P	1.552	1.690	2.917	0.542	29	2.751	0.628	1
76	QME-QUANT MARK ECON	1.76	1.640	2.386	0.276	75	2.180	1.100	1
77	MATH FINANC	1.662	1.621	2.007	0.167	145	1.947	1.294	1
78	REV ECON DYNAM	1.658	1.580	2.520	0.181	193	1.936	1.225	1
79	KYKLOS	1.506	1.578	2.343	0.189	154	1.948	1.208	1
80	J POLICY ANAL MANAG	1.683	1.567	2.294	0.172	178	1.904	1.230	1
81	RESOUR ENERGY ECON	1.563	1.560	2.448	0.219	125	1.989	1.131	1
82	AM ECON J-MICROECON	1.8	1.547	2.224	0.305	53	2.146	0.948	1
83	AM J AGR ECON	1.572	1.533	2.207	0.095	542	1.719	1.347	1
84	J ECON PSYCHOL	1.617	1.526	2.149	0.126	293	1.772	1.279	1
85	PAP REG SCI	1.659	1.512	2.048	0.156	172	1.818	1.206	1
86	J ECON MANAGE STRAT	1.489	1.505	2.556	0.188	184	1.875	1.136	1
87	J EVOL ECON	1.451	1.496	2.107	0.179	139	1.847	1.146	1
88	J ECON THEORY	1.519	1.486	2.032	0.084	591	1.649	1.322	1
89	REG SCI URBAN ECON	1.434	1.485	2.216	0.145	235	1.768	1.202	1
90	J ECON BEHAV ORGAN	1.439	1.474	2.566	0.095	726	1.660	1.287	1
91	J AGRAR CHANGE	1.582	1.442	1.577	0.180	77	1.794	1.089	1
92	ECON EDUC REV	1.443	1.440	2.301	0.124	343	1.684	1.197	1
93	INSUR MATH ECON	1.439	1.437	2.204	0.099	497	1.630	1.243	1
94	J LAW ECON ORGAN	1.672	1.435	2.514	0.234	115	1.894	0.975	1
95	ECON DEV CULT CHANGE	1.452	1.425	1.975	0.171	134	1.760	1.091	1
96	OXFORD B ECON STAT	1.44	1.408	3.502	0.253	191	1.905	0.912	0
97	INZ EKON	1.226	1.373	2.216	0.149	220	1.666	1.080	1
98	J RISK INSUR	1.433	1.358	2.288	0.166	190	1.683	1.033	1
99	TRANSFORM BUS ECON	1.009	1.355	1.566	0.126	155	1.601	1.108	0
100	OXFORD ECON PAP	1.378	1.350	2.502	0.187	180	1.716	0.984	1
101	REAL ESTATE ECON	1.355	1.339	1.776	0.159	124	1.651	1.026	1
102	GAME ECON BEHAV	1.288	1.320	2.620	0.115	518	1.546	1.095	1

TABLE 1
JOURNALS RANKED BY ESTIMATED IMPACT FACTOR (*continued*)

	Abbreviated journal title	2011 JCR 5-year IF	Estimated 5-year IF	Standard deviation	Standard error of the mean	# of articles 2006–2010	97.5%	2.5%	Median citations
103	LABOUR ECON	1.285	1.313	1.896	0.106	319	1.521	1.105	1
104	FUTURES	1.379	1.309	2.798	0.139	408	1.580	1.037	0.5
105	J POPUL ECON	1.338	1.303	1.849	0.122	228	1.543	1.063	1
106	AUST J AGR RESOUR EC	1.252	1.291	2.084	0.170	151	1.624	0.959	1
107	ANNU REV RESOUR ECON	1.745	1.278	1.446	0.241	36	1.750	0.805	1
108	INT J IND ORGAN	1.264	1.275	2.093	0.110	364	1.490	1.060	1
109	INF ECON POLICY	1.129	1.265	1.865	0.162	132	1.583	0.947	1
110	J ECON DYN CONTROL	1.223	1.244	1.829	0.069	700	1.380	1.109	1
111	CHINA ECON REV	1.362	1.242	1.700	0.115	219	1.467	1.017	1
112	AGR ECON-BLACKWELL	1.247	1.227	2.044	0.128	256	1.477	0.976	1
113	ECONOMICA	1.344	1.225	1.653	0.120	191	1.460	0.991	1
114	PUBLIC CHOICE	1.25	1.220	1.997	0.087	528	1.390	1.049	0
115	J DEV STUD	1.208	1.216	2.371	0.127	348	1.465	0.966	1
116	J PROD ANAL	1.382	1.201	1.657	0.127	169	1.451	0.951	1
117	FEM ECON	1.211	1.187	1.802	0.174	107	1.528	0.845	0
118	J IND ECON	1.306	1.185	1.836	0.146	157	1.472	0.898	1
119	POST-SOV AFF	1.068	1.151	1.340	0.157	73	1.458	0.843	1
120	REV INT POLIT ECON	1.011	1.148	1.453	0.132	122	1.405	0.890	1
121	ECON INQ	1.254	1.137	1.795	0.107	284	1.346	0.929	1
122	CAN J ECON	0.986	1.128	1.581	0.141	125	1.405	0.851	0
123	REV WORLD ECON	1.088	1.105	1.553	0.119	171	1.338	0.872	1
124	J TRANSP ECON POLICY	1.221	1.087	1.436	0.141	103	1.365	0.810	1
125	ECONOMET REV	1.418	1.084	1.593	0.139	131	1.357	0.811	1
126	B INDONES ECON STUD	1.053	1.082	1.288	0.151	73	1.378	0.787	1
127	J REAL ESTATE RES	1.168	1.079	1.347	0.134	101	1.342	0.817	0
128	NEW POLIT ECON	1.015	1.074	1.471	0.121	148	1.311	0.837	1
129	REV INCOME WEALTH	1.103	1.071	1.828	0.141	169	1.347	0.795	0
130	SCAND J ECON	1.07	1.070	1.766	0.130	185	1.325	0.816	0
131	WORLD ECON	1.196	1.063	2.620	0.135	379	1.327	0.800	0
132	CAN J AGR ECON	1.099	1.043	1.497	0.118	162	1.274	0.813	0
133	REV AGR ECON	1.048	1.043	1.679	0.116	209	1.271	0.815	0
134	J REGUL ECON	1.034	1.043	1.679	0.116	209	1.271	0.815	1
135	J FOREST ECON	1.232	1.024	1.144	0.126	82	1.272	0.777	1
136	ECONOMET THEOR	1.05	1.010	1.484	0.085	302	1.177	0.843	0
137	J ECON HIST	1.12	1.000	1.343	0.105	165	1.205	0.795	1

TABLE 1
JOURNALS RANKED BY ESTIMATED IMPACT FACTOR (*continued*)

	Abbreviated journal title	2011 JCR 5-year IF	Estimated 5-year IF	Standard deviation	Standard error of the mean	# of articles 2006–2010	97.5%	2.5%	Median citations
138	ANNU REV FINANC ECON	0.69	1.000	1.140	0.249	21	1.488	0.512	0
139	J REAL ESTATE FINANC	1.07	0.969	1.425	0.095	227	1.155	0.784	0
140	ECON PHILOS	0.938	0.947	1.188	0.136	76	1.214	0.680	1
142	INT LABOUR REV	0.714	0.907	1.582	0.161	97	1.222	0.592	0
141	ECON HIST REV	0.986	0.889	1.516	0.123	153	1.129	0.649	0
143	TIJDSCHR ECON SOC GE	0.789	0.881	1.330	0.088	227	1.054	0.708	0
144	J AFR ECON	0.946	0.880	1.297	0.101	166	1.077	0.682	0
145	INT TAX PUBLIC FINAN	0.868	0.872	1.592	0.121	172	1.110	0.634	0
146	ECONOMET J	0.964	0.869	1.322	0.113	137	1.090	0.647	0
147	CESIFO ECON STUD	0.966	0.868	1.300	0.120	117	1.104	0.633	0
148	ECON REC	0.877	0.862	1.735	0.122	203	1.101	0.623	0
149	REV DEV ECON	0.854	0.835	1.529	0.095	260	1.021	0.649	0
150	QUANT FINANC	0.92	0.834	1.582	0.089	319	1.007	0.660	0
151	ECON TRANSIT	0.893	0.827	1.324	0.112	139	1.047	0.607	0
152	J HOUS ECON	0.891	0.827	1.354	0.129	110	1.080	0.574	0
153	SOUTH ECON J	0.857	0.820	1.386	0.080	300	0.977	0.663	0
154	ECON DEV Q	1	0.815	1.114	0.076	216	0.963	0.666	1
155	EMERG MARK FINANC TR	0.899	0.814	1.179	0.089	177	0.987	0.640	0
156	CONTEMP ECON POLICY	0.826	0.807	1.660	0.112	218	1.028	0.587	0
157	ECON THEOR	0.863	0.794	1.499	0.064	553	0.919	0.669	0
158	J JPN INT ECON	0.766	0.787	1.235	0.104	141	0.991	0.583	0
159	REV IND ORGAN	0.831	0.780	1.486	0.113	173	1.002	0.559	0
160	FED RESERVE BANK ST	0.701	0.776	1.470	0.127	134	1.025	0.527	0
161	J AGR RESOUR ECON	0.803	0.769	1.183	0.094	160	0.952	0.585	0
162	J POLICY MODEL	0.799	0.768	1.386	0.075	341	0.915	0.621	0
163	EMPIR ECON	0.874	0.767	1.437	0.081	317	0.925	0.608	0
164	CLIOMETRICA	0.717	0.761	1.552	0.229	46	1.209	0.312	0
165	ASTIN BULL	0.76	0.760	1.633	0.133	150	1.021	0.499	0
166	EXPLOR ECON HIST	0.898	0.757	1.217	0.103	140	0.959	0.556	0
167	ECON MODEL	0.787	0.755	1.250	0.054	530	0.861	0.648	0
168	SPAN ECON REV	0.783	0.746	1.615	0.210	59	1.158	0.334	0
169	IMF STAFF PAPERS	0.967	0.742	1.247	0.114	120	0.965	0.519	0
170	DEV ECON	0.694	0.729	1.313	0.142	85	1.009	0.450	0
171	J COMPET LAW ECON	0.836	0.719	1.186	0.101	139	0.917	0.522	0
172	APPL ECON	0.771	0.691	1.588	0.044	1,289	0.778	0.605	0

TABLE 1
Journals Ranked by Estimated Impact Factor (*continued*)

	Abbreviated journal title	2011 JCR 5-year IF	Estimated 5-year IF	Standard deviation	Standard error of the mean	# of articles 2006–2010	97.5%	2.5%	Median citations
173	SOC CHOICE WELFARE	0.634	0.687	1.134	0.060	358	0.805	0.570	0
174	CHINA WORLD ECON	0.606	0.670	1.305	0.088	221	0.842	0.498	0
175	EUROPE-ASIA STUD	0.709	0.650	1.015	0.059	300	0.765	0.535	0
176	DEFENCE PEACE ECON	0.544	0.637	1.416	0.109	168	0.851	0.423	0
177	J POST KEYNESIAN EC	0.497	0.635	1.145	0.088	170	0.807	0.463	0
178	J MACROECON	0.665	0.618	1.008	0.056	322	0.728	0.508	0
179	J MEDIA ECON	0.614	0.614	0.996	0.132	57	0.873	0.356	0
180	OPEN ECON REV	0.615	0.613	1.380	0.108	163	0.825	0.402	0
181	J ECON	0.753	0.613	1.058	0.076	194	0.762	0.465	0
182	SCOT J POLIT ECON	0.642	0.590	1.132	0.089	161	0.765	0.415	0
183	SERIES-J SPAN ECON	0.294	0.588	0.939	0.228	17	1.035	0.142	0
184	FISC STUD	0.606	0.587	0.939	0.098	92	0.779	0.395	0
185	ECONOMIST-NETHERLAND	0.582	0.586	1.204	0.121	99	0.823	0.349	0
186	INT REV LAW ECON	0.596	0.582	0.943	0.076	153	0.731	0.432	0
187	NATL TAX J	0.634	0.570	0.852	0.058	214	0.684	0.456	0
188	ECON LETT	0.593	0.570	1.102	0.028	1,527	0.625	0.514	0
189	THEOR DECIS	0.611	0.563	1.076	0.078	192	0.715	0.410	0
190	PAC ECON REV	0.571	0.556	0.951	0.068	196	0.689	0.423	0
191	MACROECON DYN	0.62	0.546	1.118	0.078	207	0.698	0.394	0
192	AM J ECON SOCIOL	0.466	0.522	1.195	0.083	205	0.685	0.358	0
193	J ECON ISSUES	0.493	0.517	1.697	0.094	325	0.701	0.332	0
194	JPN ECON REV	0.523	0.510	0.970	0.079	149	0.666	0.354	0
195	GENEVA RISK INS REV	0.725	0.487	0.756	0.121	39	0.725	0.250	0
196	MANCH SCH	0.465	0.479	0.998	0.068	213	0.613	0.345	0
197	INT J GAME THEORY	0.531	0.467	0.892	0.062	210	0.587	0.346	0
198	STUD NONLINEAR DYN E	0.739	0.454	1.395	0.128	119	0.704	0.203	0
199	POST-COMMUNIST ECON	0.517	0.448	0.775	0.065	143	0.575	0.320	0
200	JPN WORLD ECON	0.404	0.429	0.796	0.064	156	0.554	0.305	0
201	JAHRB NATL STAT	0.386	0.409	0.764	0.058	171	0.524	0.295	0
202	J MATH ECON	0.415	0.396	0.793	0.041	371	0.477	0.316	0
203	INT J TRANSP ECON	0.448	0.395	0.771	0.083	86	0.558	0.232	0
204	J APPL ECON	0.36	0.395	0.771	0.083	86	0.558	0.232	0
205	J WORLD TRADE	0.376	0.377	0.701	0.046	236	0.467	0.288	0
206	J INST THEOR ECON	0.392	0.366	0.681	0.051	175	0.467	0.265	0
207	J ECON EDUC	0.375	0.364	0.712	0.054	176	0.469	0.258	0

TABLE 1
JOURNALS RANKED BY ESTIMATED IMPACT FACTOR (*continued*)

	Abbreviated journal title	2011 JCR 5-year IF	Estimated 5-year IF	Standard deviation	Standard error of the mean	# of articles 2006–2010	97.5%	2.5%	Median citations
208	S AFR J ECON	0.389	0.359	0.717	0.048	220	0.454	0.264	0
209	AUST ECON HIST REV	0.353	0.354	0.648	0.080	65	0.511	0.196	0
210	EASTERN EUR ECON	0.357	0.344	0.864	0.076	128	0.493	0.194	0
211	INDEP REV	0.326	0.325	0.735	0.067	120	0.457	0.193	0
212	HIST POLIT ECON	0.318	0.319	0.663	0.048	191	0.413	0.225	0
213	AUST ECON REV	0.338	0.313	0.663	0.047	198	0.405	0.221	0
214	APPL ECON LETT	0.34	0.311	0.700	0.019	1,293	0.349	0.273	0
215	FINANZARCHIV	0.331	0.305	0.660	0.061	118	0.424	0.186	0
216	POLIT EKON	0.363	0.292	0.598	0.042	202	0.374	0.210	0
217	PORT ECON J	0.268	0.286	0.706	0.094	56	0.471	0.101	0
218	EUR J HIST ECON THOU	0.209	0.226	0.559	0.048	133	0.321	0.131	0
219	J ECON POLICY REFORM	0.191	0.223	0.571	0.059	94	0.339	0.108	0
220	INVEST ECON-SPAIN	0.323	0.206	0.513	0.065	63	0.333	0.080	0
221	EKON CAS	0.22	0.196	0.659	0.039	291	0.272	0.120	0
222	S AFR J ECON MANAG S	0.189	0.174	0.436	0.033	178	0.238	0.110	0
223	REV ECON APL-SPAIN	0.217	0.174	0.505	0.053	92	0.277	0.071	0
224	REV ECON POLIT	0.159	0.148	0.471	0.036	169	0.219	0.077	0
225	INVEST ECON-MEX	0.143	0.073	0.324	0.031	111	0.133	0.013	0
226	REV ETUD COMP EST-O	0.068	0.055	0.228	0.019	146	0.092	0.018	0
227	TRIMEST ECON	0.069	0.048	0.240	0.019	168	0.084	0.011	0
228	HITOTSUB J ECON	0.062	0.046	0.211	0.026	65	0.098	−0.005	0
229	REV ECON MUND	0.177	0.014	0.119	0.010	141	0.034	−0.005	0
230	HACIENDA PUBLICA ESP	0.33	0.000	0.000	0.000	94	0.000	0.000	0

the official numbers, though there are exceptions to this rule. It is not unusual to not be able to reproduce the exact IFs published in the *JCR* (Leydesdorff and Opthof 2010; Opthof 1997). This is because Thomson-Reuters counts the total citations to the journal in the reference year while the article number excludes items such as book reviews, editorials, etc. (Opthof 1997). It is uncertain exactly which items are excluded. Also, some citations may be excluded from the Australian National University's subscription to the database and some citations may have been reported after Thomson-Reuters computed the IFs. There is a correlation of 0.989 between the two IF variables. I also found that there is a correlation of 0.33 between the absolute value of the difference between

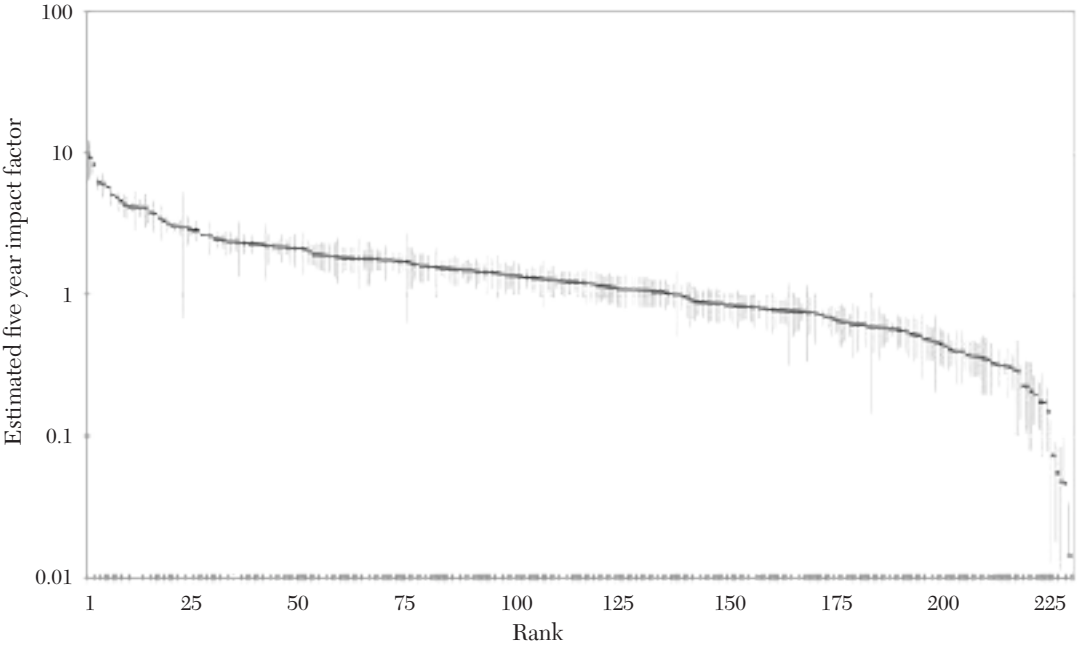

Figure 1. Estimated Five Year Impact Factors and 95 Percent Confidence Intervals

the two estimates and the estimated standard error of the IF, which shows its value as a measure of uncertainty concerning the true IF.[5]

Figure 1 presents the 95 percent confidence intervals for the journal IFs. There is some truncation of the confidence intervals for low impact journals as some of these confidence intervals include zero. A few things stand out. First, the top two journals—*JEL* and *QJE*—are clearly separated from the rest of the field. Second, there is otherwise an overlap of confidence intervals across the distribution. This does not mean that there are no significant differences in IFs among journals at widely spaced ranks, as will be discussed below. Third, there is a noticeable tail of a few very weak journals with few citations. Using 90 percent confidence intervals, there is still some overlap between the fifth and sixth lowest ranked journals, but the bottom four journals all have significantly lower IFs at the 10 percent level than all other journals in the sample. Fourth, there are a few journals with very wide confidence intervals.

[5]Journals with particularly large absolute differences between the two IFs (more than 0.50) include: *Journal of Economic Geography*, *Economic Geography*, *Pharmacoeconomics*, *Value in Health*, *International Journal of Forecasting*, *Annual Review of Economics*, the *Energy Journal*, and *Brookings Papers*. Also, for *Hacienda Publica Espanola*, my search retrieved no citations for 2011 despite the nonzero IF provided by the *JCR*. For the *Energy Journal*, I tested whether excluding special issues would make a difference to the results, but it did not. None of these are core mainstream economics journals.

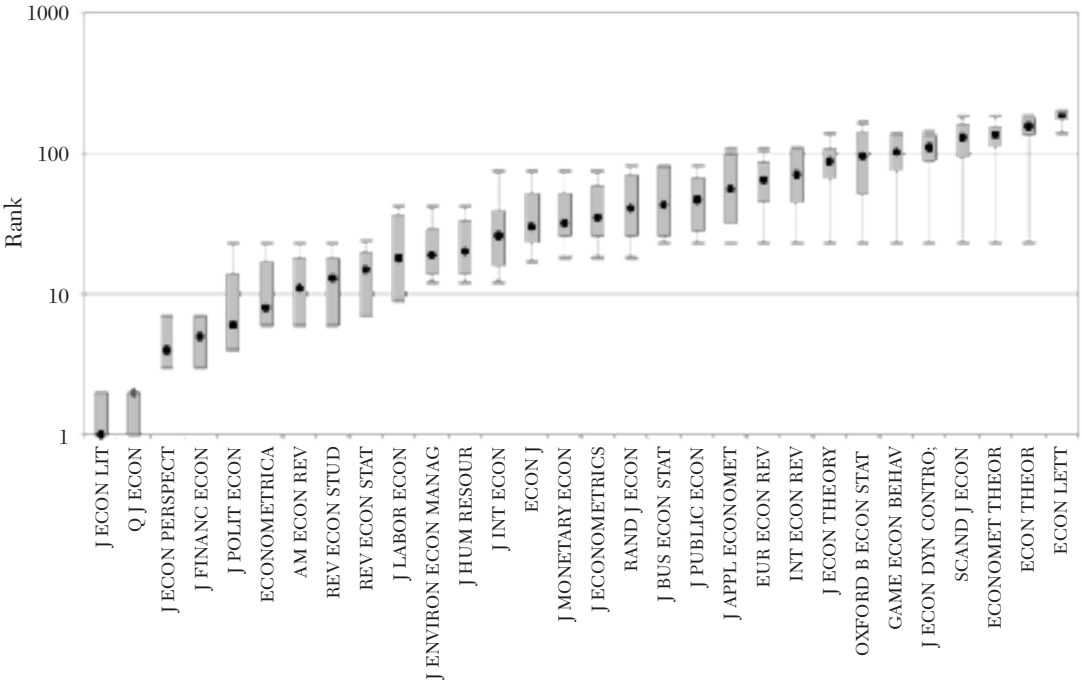

Figure 2. Range of Insignificantly Different Ranks for the "Top 30" Journals of Kalaitzidakis et al. (2003)

Notes: For each journal, the circle indicates the journal's rank according to its impact factor. The grey box gives the continuous range of ranks over which there is no significant difference in impact factor with the respective journal. The extreme value bars indicate any outlying journals with impact factors that are indistinguishable from those of the respective journals.

Most noticeable among the latter is the highly ranked *Experimental Economics*, whose 95 percent confidence interval extends from 0.68 to 5.25. This journal has a standard deviation of citations of 13.6, which is the largest in the sample. The reason for this is that the most cited article in the journal (Fischbacher 2007) received 157 citations in 2011 while the next most cited article only received 16 citations. Dropping the most cited article, the journal has a still respectable IF of 1.84 with a standard error of 0.27. Other cases of wide confidence intervals are due to small numbers of articles and hence greater uncertainty about the value of the mean.

Given the standard errors and IFs, we can conduct *t*-tests on the difference between any two IFs. Figure 2 presents the results of these tests for the thirty top journals in the analysis of Kalaitzidakis, Mamuneas, and Stengos (2003). This group includes most of the top journals by IF that would be considered mainstream economic journals—except, of course, some new journals such as *American Economic Journal: Macro*—but also a scattering of journals across the distribution of IFs down

to *Economics Letters* which has an IF of 0.57 (standard error 0.028). Kalaitzidakis, Mamuneas, and Stengos's (2003) preferred indicator divides citations by the number of pages rather than number of articles, which favors journals with short articles such as *Economics Letters*. I computed *t*-tests for the difference between the IFs of each of these journals and all 229 other journals in the sample. The upper and low whiskers of each boxplot indicate the lowest and highest rank journals that do not have a significantly different IF than the indicated journal at the 5 percent level in a two-tailed test. The shaded body of the box-plot indicates the range of ranks within which all other journals have an insignificantly different IF to the indicated journal.

Not surprisingly, the top two journals—*QJE* and *JEL*—again stand out as a class on their own. Next, the *Journal of Economic Perspectives* and the *Journal of Financial Economics* have significantly higher IFs than all journals below rank 7—from *Econometrica* on down.[6] The next group, consisting of the *Journal of Political Economy*, *Econometrica*, *AER*, and the *Review of Economic Studies*, all have higher IFs than all journals ranked below 23 (*Experimental Economics*) and the *Review of Economics and Statistics* has a significantly higher IF than all journals ranked below 24 (*American Economic Journal: Applied*). So this still seems to be a distinguishable elite group. Beyond this, journals get harder to tell apart. The range for the 30th ranked *Economic Journal,* for instance, covers journals ranked from 17th (*Journal of Labor Economics*) to 75th (*Applied Economic Perspectives and Policy*).

[6] Excluding the annual *Papers and Proceedings* issue, the range of ranks for the *AER* is from 3rd to 6th with no outliers and hence it would be included in this group of journals. No other reported ranges change by more than one place when we exclude the *AER*'s and *JEEA*'s *Papers and Proceedings* issues.

There are also some newer journals that, therefore, are not included in Kalaitzidakis, Mamuneas, and Stengos's (2003) ranking nor in figure 2, embedded among the seven journals mentioned above—the *Journal of Economic Growth* and *American Economic Journal: Macro*. Though they have slightly wider confidence intervals than this group, they also have IFs that are significantly greater than all journals ranked less than 26 (*Journal of International Economics*). Another journal with a quite high impact factor that is not included in Kalaitzidakis, Mamuneas, and Stengos's top journals is *Ecological Economics*, which has a significantly higher IF than all journals ranked lower than 42 (*Journal of Economic Surveys*). Of course, environmental economics journals, and especially *Ecological Economics*, receive large numbers of citations from outside of economics (Ma and Stern 2006), which will tend to boost their IFs.

A similar perspective is reflected in the median citations in 2011 to papers published between 2006 and 2010 in each journal (figure 3). Because of the small number of citations that each paper typically receives in a given year, large numbers of journals have identical medians. Most journals have median citations of 0 or 1 with seventeen journals sharing a median of 2 and only a few journals receiving 3 or more median citations (table 1). Using standard methods (Bloch and Gastwirth 1968; Olive 2005), many of these medians will have zero standard errors. So, though large groups of journals have equal rank there should be significant differences between groups of higher and lower impact journals.

4. *Discussion and Conclusions*

In this paper, I presented standard errors for the five year IFs for 230 economics journals. They show that the top two journals are clearly set apart from the others and

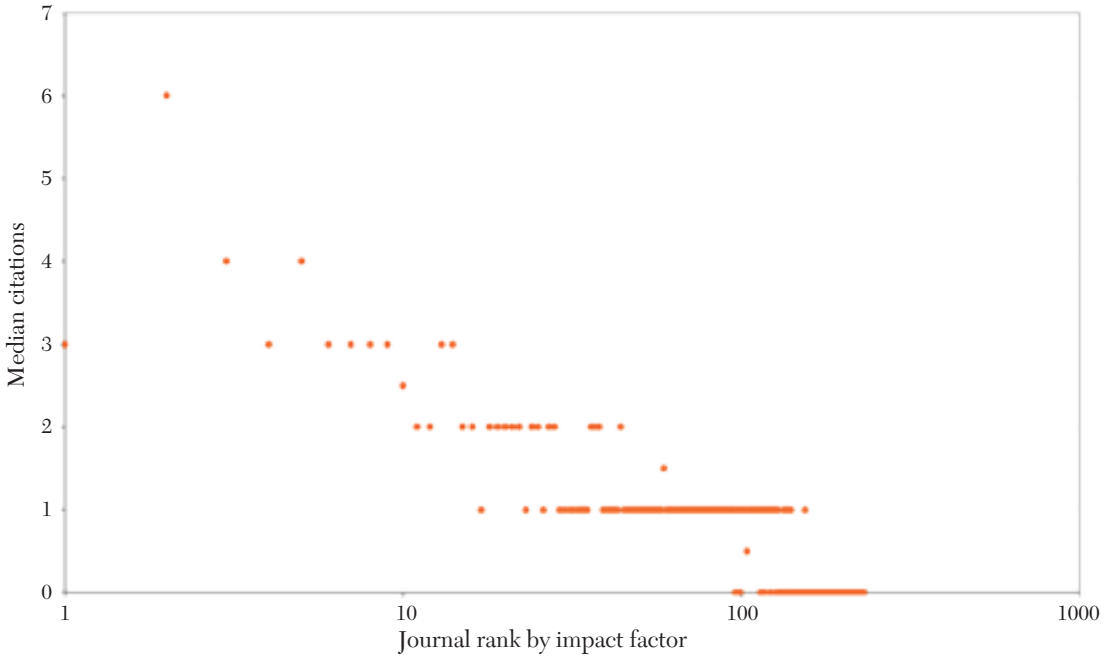

Figure 3. Median Citations

that beyond this there is a group of seven mainstream long-established economics journals, which can be clearly distinguished from the vast majority of other journals. Two newer journals—*Journal of Economic Growth* and *American Economic Journal: Macro*—are also embedded among these seven. This grouping is commensurate with common ideas of the group of top journals in economics. For lower ranked journals, large swathes of journals have statistically indistinguishable IFs and, therefore, ranks. At least using simple IFs, there does not seem to be much coherence to the notion that there is a broader group of 30 or so core journals as listed by Diamond (1989), Burton and Phimister (1995), or Kalaitzidakis, Mamuneas, and Stengos (2003), or recognized by the Australian government's ERA 2010 group of A* journals, for example (Australian Research Council 2011).

As noted above, though they are prominently reported by journals themselves, simple IFs may not be the most appropriate measure of journal quality and recursive indicators are more popular in economics journal ranking studies. However, there is no simple way to construct uncertainty measures for these iterative indicators. Therefore, this paper uses the simple IF, which is used for computing recursive IFs, as a starting point for constructing measures of the precision of journal rankings in economics. It seems likely that the level of uncertainty concerning rankings revealed here would also attend rankings produced using more sophisticated

indicators. I also presented median citations in this paper. Most journals have a median of either zero or one citation in 2011 to papers published in 2006–10. On this basis, it is not possible to discriminate among large numbers of journals with the same median though there are probably significant differences between groups with different medians.

Direct comparison of my results with recent work on the distribution of citations in economics (Oswald 2007; Wall 2009) is hard except to again note that there is a wide dispersion in the number of citations received by articles in any given period. My analysis does show, however, that IFs themselves are quite uncertain and a broad range of journals can have statistically indistinguishable IFs. It does not seem to be justified to give a researcher more credit for publishing in the *Journal of Applied Econometrics* than in the *Oxford Bulletin of Economics and Statistics* ($t = -1.36$), for example, if what we care about is potential citation impact. As long as research assessments and search committees wish to evaluate very recent publications, it seems inevitable that they will use some form of journal ranking as a proxy quality indicator. This paper shows that though this may be justified to some degree, for the majority of journals fine distinctions in rank are not possible using IFs.

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